Psychological consequences of participating in the rescue after a mass incident or catastrophe – a questionnaire study of medical rescue workers

(Psychologiczne konsekwencje uczestnictwa w akcji ratunkowej podczas katastrofy lub zdarzenia masowego- badania ankietowe ratowników)

O Odrobina [1,A,D] , Z Kopański [1,2,F], G Sianos [3,B], Strychar [2,C] , Ł Małek [2,E]

Abstract – Introduction. Nowadays it is commonly observed that people who have witnessed health- or life-threatening incidents may develop deep and long-lasting changes in functioning that can lead to mental and somatic disorders.

The aim of the study. The aim of the study was to evaluate medical rescue workers'; capacity to cope with the influence of strong stressors which lead to PTSD (post-traumatic stress disorder).

Materials and methods. The study was carried out on the group of 66 randomly selected medical rescue workers from 15 Medical Rescue Stations located in the Małopolskie and Mazowieckie provinces. To measure the scale of disorders after the traumatic stress experience, the Polish version of the Impact of Event Scale-Revised developed by Zygfryd Juczyński and Nina Ogińska-Bulik was used. The statistical analysis has been carried out using the PQStar 2015 software.

The results and conclusions. In the author's own study, the mean point values attributed to PTSD after traumatic stress experiences amounted to 1,67±0,7. This may suggest that the medical rescue workers surveyed develop disorders related to traumatic stress experiences due to the nature of their professional activities. The mean point values of the two genders do not differ significantly, so gender does not play a relevant part in the surveyed group of people as far as the severity of the intrusion, the stimulation factor, avoidance, and PTSD severity are concerned. The mean point values assigned to the severity of the intrusion, the stimulation factor, and avoidance across different age groups indicate that similar results were obtained for the groups below 34 and over 44 years of age. Lower values at respective subscales were obtained in the age group of 35-44. Despite the fact that the severity in various subscales differed in the surveyed age groups, the age of the participants had no significance for the distribution of points on the Impact of Event Scale-Revised. The highest mean point values of severity of the intrusion, the stimulation factor, and PTSD were observed in the group with no more than 2 years of professional experience. Despite the differences in the mean point value assigned to the respective subscales as well as PTSD for different durations of professional experience, this factor does not have a statistically significant role in the severity in studied subscales or the severity of PTSD. Among medical rescue workers, the ones who are most vulnerable to PTSD are females, those under 44 years of age, and those with less than 5 years of experience.

Key words - PTSD, Impact of Event Scale-Revised, surveys, medical rescue worker.

Streszczenie – Wstęp. Współcześnie podkreśla się, że u osób, które miały do czynienia ze zdarzeniami stanowiącymi realne zagrożenie zdrowia i życia mogą powstawać głębokie i długotrwale utrzymujące się zmiany w funkcjonowaniu, które wyrażają się w zaburzeniach somatycznych i psychicznych.

Cel badań. Celem badań była ocena skuteczności radzenia sobie ratowników medycznych w pracy zawodowej z działaniem silnych stresorów prowadzących do występowania PTSD (*post-traumatic stress disorder*).

Materiał i metodyka. Badania przeprowadzono na grupie 66 ratowników medycznych z 15 losowo wybranych Stacji Ratownictwa Medycznego województwa małopolskiego i mazowieckiego. Do pomiaru zaburzeń po stresie traumatycznym wykorzystano polską wersję Zrewidowanej Skali Wpływu Zdarzeń w adaptacji Zygfryda Juczyńskiego i Niny Ogińskiej-Bulik. Analizę statystyczną przeprowadzono z wykorzystaniem PQStar 2015.

Wyniki i wnioski. W badaniach własnych uzyskano średnią wartość punktową przypisaną PTSD— zaburzeniom po stresie pourazowym wynoszącą 1,67±0,7. Wskazywać to może, że u badanych ratowników medycznych, z racji charakteru wykonywanych

czynności zawodowych rozwijają się zaburzenia po stresie pourazowym. Różnice pomiędzy średnimi punktowymi obu płci nie różnią się istotnie statystycznie, a więc w badanej grupie płeć nie ogrywa znamiennie statystycznie roli w nasileniu intruzji, czynnika pobudzenia, unikania oraz nasilenia PTSD. Średnie wartości punktowe przypisane intruzji, czynnikowi pobudzenia, unikania w poszczególnych przedziałach wiekowych wskazują, że zbliżone wartości wykazywali respondenci w wieku do 34 r.ż. i powyżej 44 r.ż. Niższe średnie wartości poszczególnych podskal prezentowały osoby w wieku 35-44 lata. Pomimo różnego nasilenia poszczególnych podskal w badanych przedziałach wieku, wiek nie posiada istotnego statystycznie znaczenia dla rozkładu punktów czynnikowej Zrewidowanej Skali Wpływu Zdarzeń. Najwyższe średnie wartości punktowe intruzji, czynnika pobudzenia, unikania a także PTSD prezentowali respondenci o stażu pracy do 2 lat. Pomimo występujących różnic w średniej wartości punktowej przypisanej poszczególnym podskalom a także PTSD dla różnej długości stażu pracy, czynnik ten nie odgrywa istotnej statystycznie roli w nasileniu badanych podskal oraz nasileniu PTSD. Wśród ratowników medycznych predestynowanymi do wystąpienia PTSD (choć nieistotnie statystycznie często) są: ratownicy medyczni kobiety + ratownicy medyczni w wieku do 44 r.ż. + ratownicy medyczni o stażu pracy w zawodzie do 5 lat.

Słowa kluczowe **-** PTSD, Zrewidowana Skala Wpływu Zdarzeń, badania ankietowe, ratownik medyczny.

Author Affiliations:

1. Faculty of Health Sciences, Collegium Medicum, Jagiellonian University
2. Collegium Masoviense – College of Health Sciences, Żyrardów
3. Glasgow Royal Infirmary Trauma and Orthopaedic Department Glasgow

Authors' contributions to the article:

A. The idea and the planning of the study
B. Gathering and listing data
C. The data analysis and interpretation
D. Writing the article
E. Critical review of the article
F. Final approval of the article

Correspondence to:

Prof. Zbigniew Kopański MD PhD, Collegium Masoviense - College of Health Sciences, Żyrardów, G. Narutowicza 35 Str., PL-96-300 Żyrardów, Poland, e-mail: zkopanski@o2.pl

Accepted for publication: July 2, 2016.

I. POST-TRAUMATIC MENTAL DISORDERS

It is commonly observed nowadays that people who experienced a direct, real threat to their well-being and life may develop deep and sustainable changes to their functioning. These changes are manifested through somatic and mental disorders. The source of-post traumatic mental disorders is the health- and life-threatening situation experienced and strong negative emotions associated with it. The instances of such emotions include: extreme anxiety, fright, helplessness, and sometimes even dissociative disorders (such as the feeling that what is happening is unreal or the person is absent during the catastrophe) [1,2]. The most commonly diagnosed post-traumatic stress disorders include: acute stress reaction, post-traumatic stress disorder, adaptation disorders, a brief psychotic disorder with a marked stressor, a sustainable personality change after an extreme situation, a complex post-traumatic stress disorders (C-PTSD, DESNOS).

In the pathophysiology of these conditions, the factor often emphasised is the significance of the reduction of the length of cellular appendages and the level of dendritic branching of CA3 cells located predominantly in hippocampus. It is widely emphasised that the mental condition constituting a stressor causes distress – the kind of stress in which the instant restoration of the pre-traumatic balance remains in the consciousness as the reflection of, for example, pain, smell, or sound in the neuron structures. Traumas tend to leave a destructive mark upon the consciousness of the people affected. Since the consciousness that changes because of the trauma, the trauma is treated as an internal rather than external factor. Such approach to the role of a trauma in the destruction of consciousness allows one to interpret PTSD (post-traumatic stress disorder) as a phenomenon that develops regardless of the aggression motivation level manifested by the seeming adaption to the stimulant (a strong stressor) [3 -8].

In the theory of PTSD development, it is believed that two mechanisms may be at work: the neurobiological and psychological one. In the neurobiological mechanism, there is an emphasis on the crucial role of activation mechanism disorders indicated by neurological hypersensitivity and sustainable activation in subcortical structures of the limbic system [3]. Win the psychological mechanism of PTSD development, disorders in cognitive psychology and cognitive patters are believed to be of significance.

One of the most commonly quoted theories aimed at explaining the role of psychological mechanisms in the occurrence of PTSD is Horowitz's mismatch theory indicating that an individual who experiences PTSD displays cer-

tain cognitive patterns formed by the life experience-based information, beliefs, and expectations towards the future. This means that the person tries to process every new piece of information and match it to the existing patterns. New information tends to mismatch the existing structures that are based on the assumption that the reality is safe, which is why they cannot be assimilated or included under the cognitive patterns [9].

The contemporary view on the two theories on PTSD development is that they do not contradict each other and complement each other [3].

Another interpretation of the occurrence of PTSD was assumed by Foa et al. [qtd in 3]. They assumed that the people who are most susceptible to PTSD are those who have the extremely positive or extremely negative patterns in their perception of the reality or themselves. The individuals who are at the least risk to PTSD are those with plastic, real patterns built upon the information that the world is both safe and dangerous. Some authors also emphasise the significance of other factors such as temperament and the style of coping with the development and persistence of PTSD symptoms [10].

Others think that PTSD develops not as a direct outcome of a traumatic event, but as a result of a strong post-traumatic reaction triggered by the event [11].

Regardless of mechanisms that explain the development of PTSD, many authors claim that post-traumatic stress disorders are increasingly frequent in the contemporary reality [3-6].

The purpose of the study was to assess how effectively medical rescue workers cope in their professional life with strong stressors that lead to PTSD.

II. MATERIALS AND METHODS

Materials

The study was conducted in a group of 66 medical rescue workers (Table 1) in 15 randomly selected Medical Rescue Stations in the Małopolskie and Mazowieckie provinces. The study was conducted between February 1st and April 18th, 2016.

Table 1. Study group data

Selected parameter	Categories	Number	%
Sex	Men	44	66.7
	Women	22	33.3
Age	Under 35	24	36.4
	35-44	28	42.4
	Over 44	14	21.2
Work experience	Less than 3 years	28	42.4
	3-5 years	26	39.4
	over 5 years	14	21.2

Methods

To measure the scale of disorders after the traumatic stress experience, the Polish version of the Impact of Event Scale – Revised developed by Zygfryd Juczyński and Nina Ogińska-Bulik was used [12].

Impact of Event Scale is composed of 22 statements describing the symptoms of stress experienced within 7 days after the traumatic event. The assessment is made on a 5-degree Likert scale (0–4). It is used to define the current, subjective discomfort feeling related to the specific event.

It takes into account three dimensions of PTSD:

- Intrusion, which expresses recurrent images, dreams, thoughts, or perception sensations related to the trauma;
- Excitement characterised by increased awareness, anxiety, impatience, troubles concentrating;
- Avoidance manifested by effort to get rid of thoughts, emotions, or conversations related to the trauma.

Methodology data:

Assuming that the mean of 1.5 for the general scale indicator is a borderline value, the score exceeding that can be treated as indicative of PTSD [12].

The scores of the subscales of the Impact of Event Scale – Revised were analysed in relation to the sex, age, and work experience.

The age brackets were: under 35, 35-44, and over 44.

The work experience brackets were: less than 3 years, 3-5 years, over 5 years.

Statistical analysis

The statistical analysis was performed using PQStar 2015. Basic statistical data were calculated and for the purpose of comparing the mean point values and their categories, a t+Student test was applied. The statistical significance level as assumed to be $p<0,05$.

III. RESULTS

The distribution of points on the Impact of Event Scale – Revised

The distribution of points on the Impact of Event Scale – Revised: the entire study group

The mean intrusion point value calculated for the entire respondent group was 1.67 ±0.5. The mean excitement factor point value was 1.79±0.7, and the mean avoidance point value was 1.45 ±0.5. The mean point value of PTSD was1.64±0.7.

The distribution of points on the Impact of Event Scale – Revised: the sex of the participants

The results obtained indicate that for men, the mean intrusion point value was 1.53±0.7, while for women it was 1.74±0.9. The mean excitement factor point value was 1.56±0.7 for men and 1.77±0.6 for women. The mean avoidance point value was 1.59±0.4 for men and 1.31±0.6 for women. The PTSD mean point value was 1.58±0.9 for men and 1.65±0.6 for women. The comparison of the mean point values for intrusion, excitement, and avoidance indicates that women scored higher than men on those subscales. The studied women also indicated higher PTSD mean point values than men.
That being said, the differences between mean point values for the two sexes were not statistically significant. Thus, in the study group, sex was of no statistical significance as far as intrusion, excitement, and avoidance factors are concerned.

The distribution of points on the Impact of Event Scale – Revised: the age of the participants

The results yielded the following mean point values for the age group under 35: 1.77±0.5 for intrusion, 1.81±0.9 for excitement, 1.65±0.8 for avoidance, and 1.80±0.9 for PTSD itself. For the respondents aged 35-44, the mean point values were: 1.52±0.9 for intrusion, 1.62±0.8 for excitement, 1.39±0.9 for avoidance, and 1.52±0.6 for PTSD. For the age group over 44, the mean point values were: 1.77±0.5 for intrusion, 1.79±0.7 for excitement, 1.31±0.8 for avoidance, and 1.39±09 for PTSD.
The comparison of the mean point values of intrusion, excitement, and avoidance in the subsequent age groups has shown that the responders under 35 and over 44 displayed similar point values. Responders between 35 and 44 had lower values on the subscales analysed. Despite the differences, age was not observed to be factor bearing any statistical significance for the distribution of points on the Revised Impact of Event Scale.

The distribution of points on the Impact of Event Scale – Revised: the work experience of the participants

The results obtained have shown that for respondents with up to two years of experience at medical rescue, the following values were obtained: 1.72±0.8 for intrusion, 1.91±0.7 for excitement, 1.66±0.9 for avoidance, and 1.77±0.9 for PTSD. In the respondent group who had worked in the profession for 3-5 years, the following values were observed: 1.64±0.6 for intrusion, 1.65±0.8 for excitement, 1.35±0.9 for avoidance, and 1.55±0.9 for PTSD. Finally, for the respondent group with over 5 years of experience, the mean point values were: 1.47±0.7 for intrusion, 1.52±0.9 for excitement, 1.39±0.8 for avoidance, and 1.47±09 for PTSD.
The highest mean point values for intrusion, excitement, avoidance, and PTSD were displayed by the responders with up to 2 years of work experience in medical rescue. Despite the differences in the point values obtained in the relevant subscales as well as PTSD for different work experience ranges, no statistical significance was observed.

The impact of the selected factors on the risk of PTSD

According to the data offered by the authors of the Impact of Event Scale – revised, if the mean point value for PTSD reaches 1.5, it can be treated as the indicator of PTSD occurrence. Assuming this interpretation for this study, one can observe that the PTSD mean point value obtained of 1.67±0.7 for the whole group shows that the studied individuals do experience PTSD.
In the part of the analysis that follows, it is indicated which categories (sex, age, work experience) impact the risk of PTSD occurrence, however statistically insignificantly. Figure 1 shows the results.

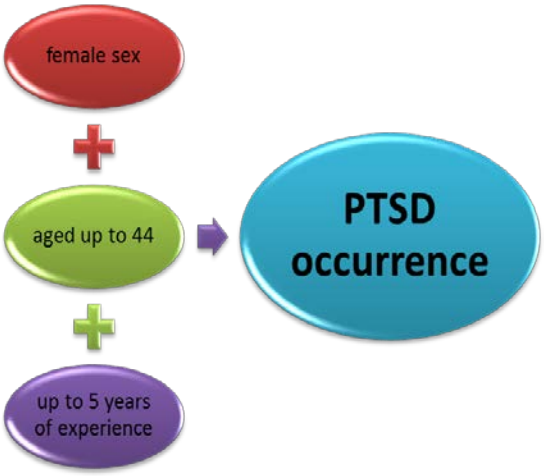

Figure 1. The impact of the analysed categories on PTSD occurrence in the studied group

The data obtained suggest that the medical rescue workers most likely to develop PTSD (though statistically insignificantly) are: women medical rescue workers, plus workers up to 44 years of age, plus those with up to 5 years in medical rescue.

IV. DISCUSSION

The impact of strong stressors combined with the lack of skills to cope with them may lead to a multitude of disorders. One of them is post-traumatic stress disorder (PTSD) [3-7].

In Poland, several tools to measure PTSD have been developed. One of them is the Mississippi Scale for PTSD that addresses the symptoms, depressive behaviour, suicidal tendencies, and guilt [12]. Another is the Impact of Event Scale – Revised. It constitutes the updated IES by Weiss and Marmar [13], formed by 22 statements addressing 3 dimensions of PTSD. The updates to the revised version are significant. The statement on sleep has been replaced by two statements: number 2 addressing Intrusion and number 15 addressing Excitement.

There are 7 new statements, including 6 on Excitement and one on Intrusion. The scales of Intrusion and Avoidance are composed of 8 statements, whereas the new Excitement scale pertaining to impatience, overconcentration, awareness and physiological excitement has 6 statements. Juczyński and Ogińska- Bulik, the authors of the scale, emphasised the high reliability factor evaluated by estimating the internal cohesion of the scale and its absolute stability. Internal cohesion assessed using the Crombach scale was 0.92 for the entire scale, and 0.89, 0.85 and 0.78 for Intrusion, Excitement, and Avoidance, respectively. This justifies the assumption that the Impact of Event Scale-Revised is a fully credible research tool. The scale can be used to diagnose the symptoms of PTSD and monitor the changes in patients under psychological care or psychiatric treatment because of traumas experiences, as well as to evaluate the therapeutic programmes implemented in cases of groups displaying the symptoms of PTSD [10].

The Impact of Event Scale – Revised and similar tools are most commonly used to study the professional groups that are especially exposed to the occurrence of a traumatic event of a specific type that could lead to the development of PTSD. These groups include above all rescue services: among others, medical rescue workers, fire fighters, and policemen [3,9,15,16].

The aforementioned recommendations and opinions fully justify the use of the Impact of Event Scale – Revised for the authors' study of medical rescue workers. The authors of the scale emphasised the fact that the mean result over 1.5 point value obtained can be treated as the indication of PTSD [12].

The mean point value for PTSD obtained in this study is 1.67±0.7. This could indicate that the studied medical rescue workers are developing post-traumatic stress syndrome as a result of the professional role performed. The results obtained correspond with the observations of other authors [3,17]. Their conclusion is that traumatic experiences after events are a frequent occurrence for rescuers who take part in operations (regardless of the service type). For example, among fire fighters, they occur in around 86% of the cases, for medical rescue workers, they occur in 72% of the cases, and among policemen the percentage is 57%. In the study by Juczyński and Ogińska-Bulik [12], the mean point value for PTSD in the group of fire fighters, who are exposed to PTSD most frequently, was 0.99±0.79. The mean point value obtained in this study was thus 69% higher than the value registered by Juczyński and Ogińska-Bulik.

The study conducted indicates that the differences between mean point values for either sex are statistically insignificant, so sex is not a significant factor for the intensity of Intrusion, Excitement, Avoidance, or PTSD.

The comparison of mean point values of intrusion, excitement, and avoidance obtained in the respective age groups shows, that similar values were recorded for the responders below 35 and over 44. Lower mean point values were obtained for the age group of 35 to 44. Despite the varying intensity of the subscales in the studied age groups, this factor had no statistical significance in the point distribution over the Impact of Event Scale.

The authors' study has also explored the relevance of the working experience for the intensity of each subscale level

as well as PTSD. The highest mean point values of intrusion, excitement, avoidance, and PTSD were obtained in the group with up to two years of experience. Despite the differences in the mean point value for the subscales and PTSD for the work experience duration, this factor had no statistical significance for the studied data.

Another part of the study was aimed at analysing which scrutinized categories (age, sex, work experience) have an impact, thought statistically insignificant one, on the PTSD development. The assumption was that PTSD is the case when the mean point value assigned to it is 1.5 or more. The data obtained showed that the medical rescue workers studied, the ones that are (albeit statistically insignificantly) most likely to develop PTSD are: women, people up to 44 years of age, and those with up to 5 years of professional experience.

Despite numerous studies on the subject of exposure to various stressors in medical rescue, quantitative data are taken into account infrequently. This study can be treated as an incentive for discussion on the matter.

V.REFERENCES

[1] Wnukowski K, Kopański Z, Sianos G. Specyfika pracy ratownika medycznego. JCHC 2015;3:2-9.

[2] Wnukowski K, Kopański Z, Brukwicka I, Sianos G. Zagrożenia towarzyszące pracy ratownika medycznego - wybrane zagadnienia. JCHC 2015;3:10-16.

[3] Dudek B. Zaburzenie po stresie traumatycznym. Gdańsk; Gdańskie Wydawnictwo Psychologiczne, 2003.

[4] Heszen-Niejodek I. Teoria stresu psychologicznego i radzenia sobie. W: Psychologia. Strelau J. (red.) Gdańsk; Gdańskie Wydawnictwo Psychologiczne 1999: 465–492.

[5] Heuser I, Lammers CH. Stress and the brain. Neurobiol Aging 2003; 24: 869-876.

[6] Mastalerz M. Zaburzenie po stresie traumatycznym (PTSD). Remedium 2010; 1: 22–23.

[7] Uszyński M. Stres i antystres — patomechanizm i skutki zdrowotne. Wrocław; Wydawnictwo MedPharm Polska, 2009.

[8] Karakiewicz A, Zabielska P , Bażydło M , Kotwas A, Brzostek B, Rotter I. The risk behaviour of junior school youth as presented in literature. JPHNMR 2014; (1):15-21.

[9] Dudek B, Koniarek J. Osobowościowe uwarunkowania rozwoju zaburzenia po stresie traumatycznym. W: Strelau J. (red.). Osobowość a ekstremalny stres. Gdańsk; Gdańskie Wydawnictwo Psychologiczne, 2004:183–198.

[10] Pawłowski P. Temperament i style radzenia sobie ze stresem jako moderatory zespołu stresu pourazowego w następstwie przeżytej katastrofy. W: Strelau J. (red.). Osobowość a ekstremalny stres. Gdańsk; Gdańskie Wydawnictwo Psychologiczne, 2004: 48–64.

[11] McFarlane AC, Yehuda R. Resilience, vulnerability and course of posttraumatic reactions. W: van der Kolk B, McFarlane A. Traumatic stress: The effects of overwhelming experience on mind, body and society. New York; Guilford Press, 1995: 155–181.

[12] Juczyński Z, Ogińska-Bulik N. Pomiar zaburzeń po stresie traumatycznym — polska wersja Zrewidowanej Skali Wpływu Zdarzeń. Psychiatria 2009; 6(1):15-25.

[13] Lis-Turlejska M., Łuszczyńska-Cieślak A.: Adaptacja cywilnej wersji Kwestionariusza Zespołu Stresu Pourazowego: Mississippi PTSD Scale. Czas Psychol 2002; 7: 165–173.

[14] Weiss D, Marmar C. The Impact of Event Scale-Revised. W: Wilson J, Keane T. Assessing psychological trauma and PTSD: A handbook for practitioners. New York; Guildford Press, 1997: 399–411.

[15] Koniarek J, Dudek B. Zespół zaburzeń po stresie urazowym a stosunek do pracy strażaków. Med Pr 2001; 3: 177–183.

[16] Ogińska-Bulik N, Langer I. Osobowość typu D i strategie radzenia sobie ze stresem a nasilenie objawów PTSD w grupie strażaków. Med Pr 2007; 58: 307–316.

[17] Ogińska-Bulik N, Kaflik-Pieróg M. Stres zawodowy w służbach ratowniczych. Łódź; Wydawnictwo Wyższej Szkoły Humanistyczno-Ekonomicznej, 2006.